



# Renewable Energy for Connecticut

Where are we? Where are we going?

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Executive Director  
February 8, 2018



Connecticut Energy & Technology Committee



# About RENEW

An association of the renewable energy industry and environmental advocates united to promote renewable energy in the Northeast.





# **Connecticut's Renewable Portfolio Standard (RPS) Today and Beyond 2020**

## What is the RPS?

- A requirement on retail electric suppliers...
- to supply a minimum percentage (rising each year until it plateaus in 2020) of their retail load...
- with eligible classes of renewable energy (Class I is wind, solar, fuel cells, some small hydro).
- It has penalties for non-compliance; and
- Tradable Renewable Energy Certificates (REC) to facilitate compliance.



# Importance of RECs for RPS Compliance

- The REC market price shows whether REC supply and demand are in balance. It sends a signal to developers on whether to invest in renewable energy development and/or sell RECs in the region;
- REC sales are important source of revenue for renewable generators whether in short-term transactions or bundled in long-term contracts; and
- RECs demonstrate compliance by retail electricity providers for RPS obligations and document RPS costs.

# The RPS Beyond 2020

- Competitive clean energy procurements authorized by legislation in 2013, 2015 and 2017 are important to meeting RPS requirements:
  - The greater revenue certainty of contracts from reduced investor exposure to commodity market price risk increases chance of projects getting financing and at a lower rate; and
  - Lower financing costs and competitive nature of procurement lowers consumer costs.
- Procurements might oversupply RECs in the long term but . . .
  - It does not result in huge RPS compliance cost savings as utilities sell RECs for large loss and place costs on ratepayers; and
  - Oversupply shuts down some existing renewable resources and will require more natural gas generation to enter service.



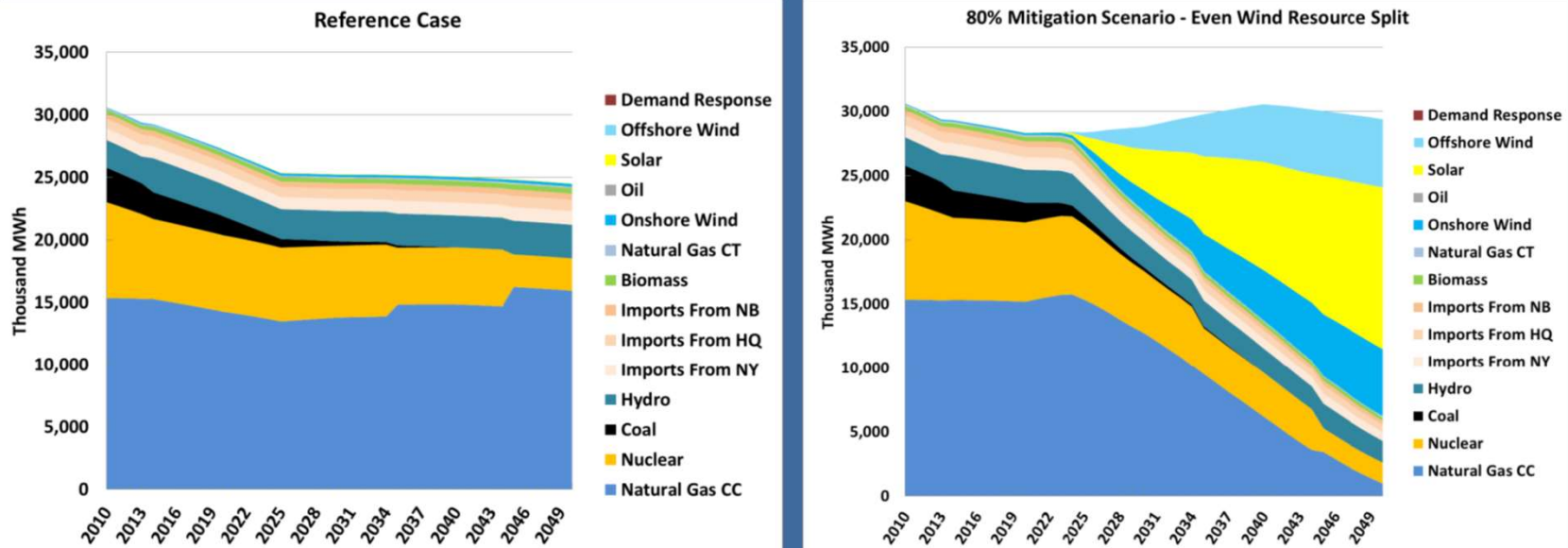
# Compliance with Global Warming Solutions Act (GWSA)

- To count additional procured supply towards GWSA and RGGI limits, RPS targets must be increased so RECs are retained for Connecticut; and
- If RPS targets are not increased, RECs associated with procured supply could be sold for RPS compliance in other states. When these RECs are sold, the ability to count the associated greenhouse gas characteristics is lost.



# GC3's 2050 Greenhouse Gas Mitigation

## Renewable Generation Sensitivity Even Wind Resource Split (45% Scenario)



Overall renewable generation represents 75% of total generation by 2050

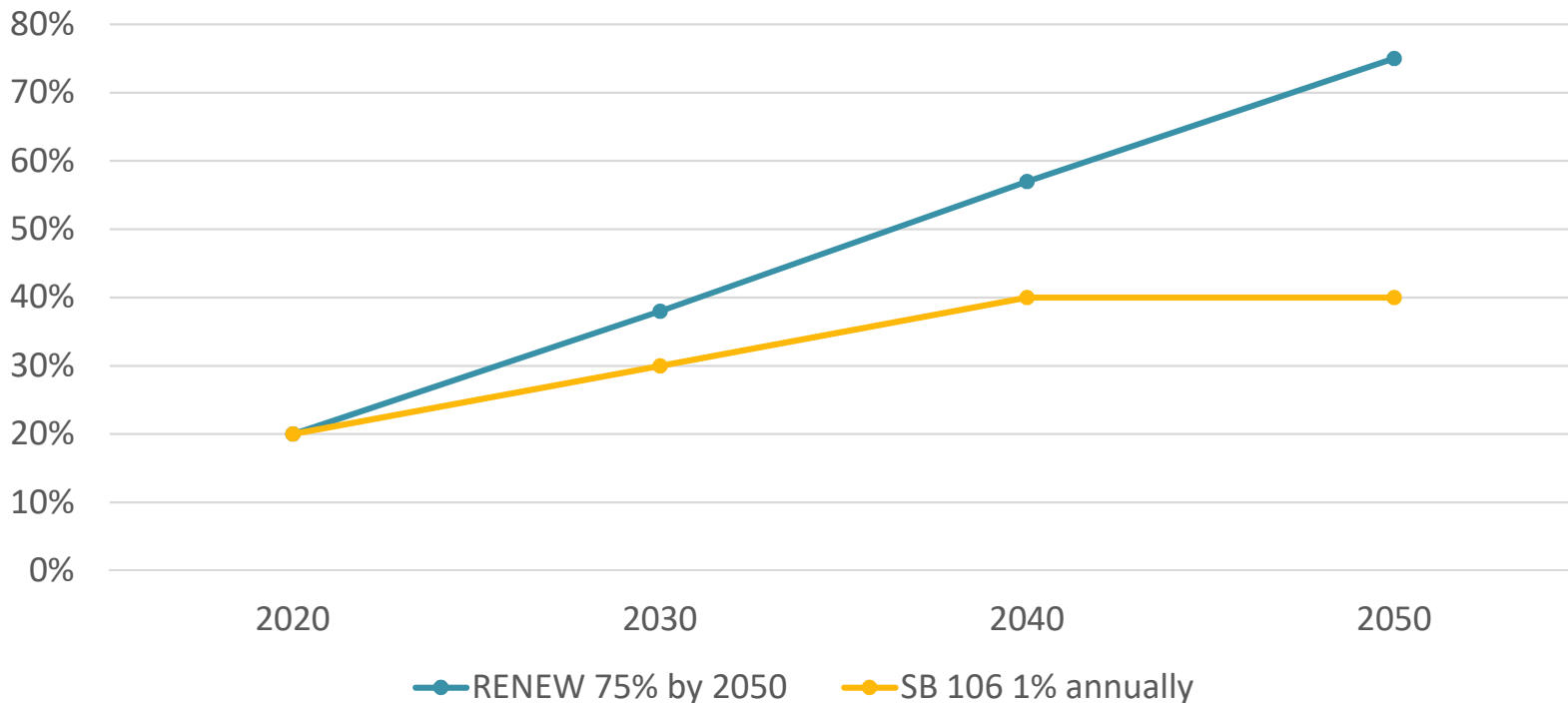
- Utility-scale solar = 40%
- Onshore wind = 17.5%
- Offshore wind = 17.5%

Levelized cost of energy is 23% to 26% higher than reference case



## GC3's 2050 Greenhouse Gas Mitigation

Meeting the GC3 75% Renewable by 2050

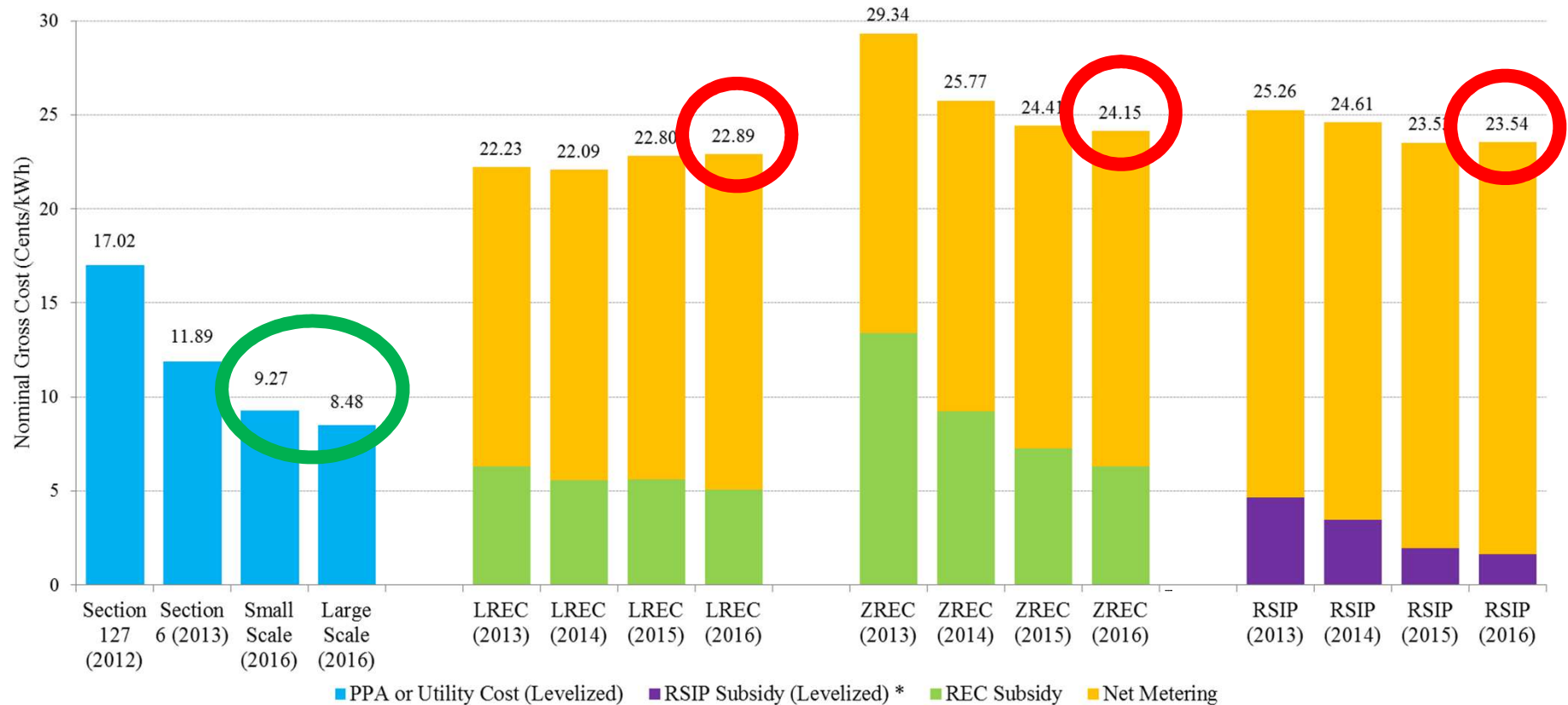


After 2020, annual increases of nearly 2% needed to reach Connecticut Governor's Council on Climate Change scenario of 75% by 2050



# **Large-Scale Renewable Energy Available to Connecticut**

# Large Projects Have Lowest Prices



Source: 2017 Connecticut Department of Energy and Environment Protection

**Small PPA project size = 2 to 20 megawatts**

**Large PPA project size = 20 megawatts and greater**

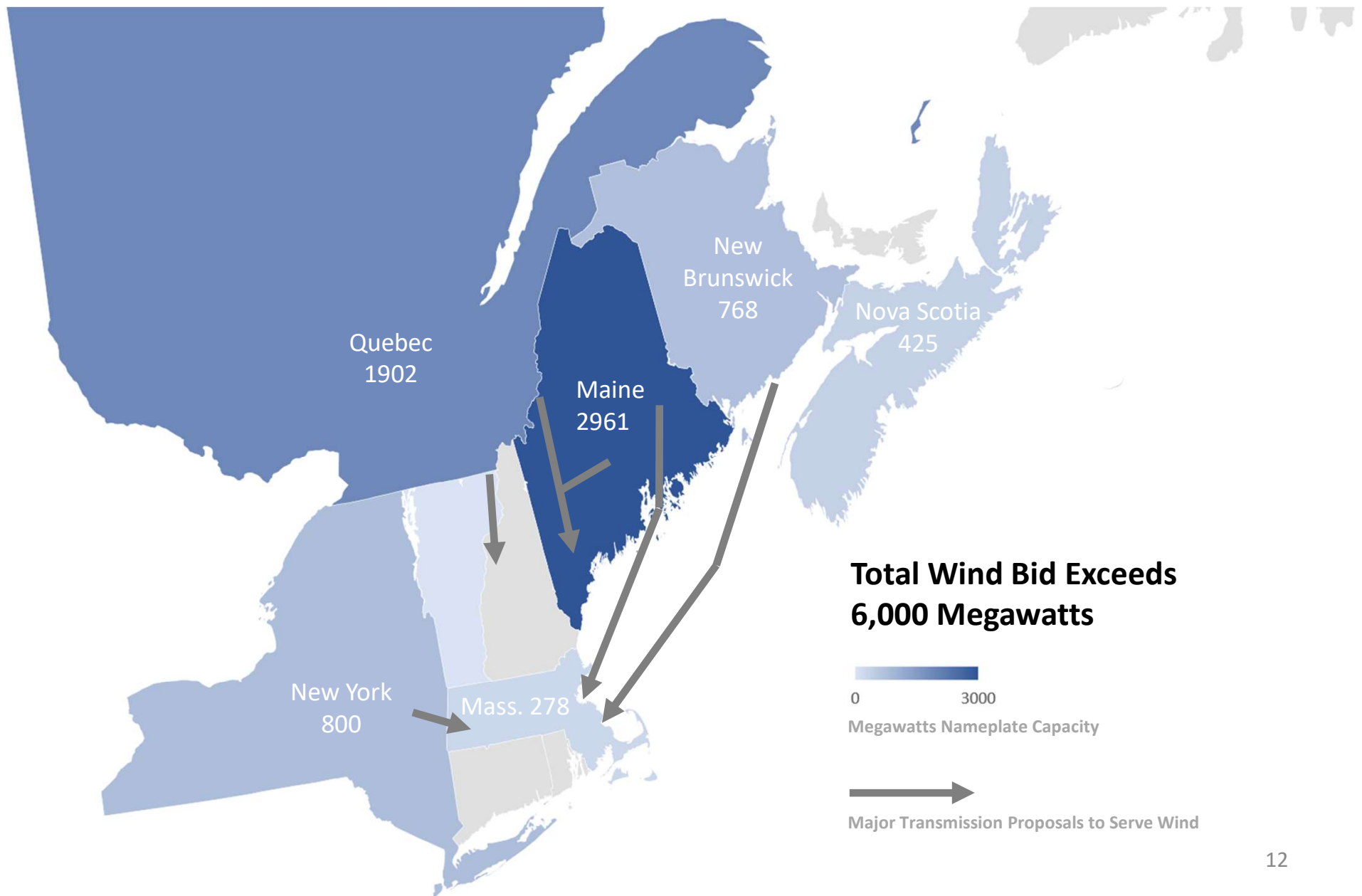
**LREC project size = 2 megawatts or less**

**ZREC project size = 1 megawatt or less**

**RSIP = Residential Solar Investment Program**



## Massachusetts 2017-2018 Clean Energy RFP Wind Bids



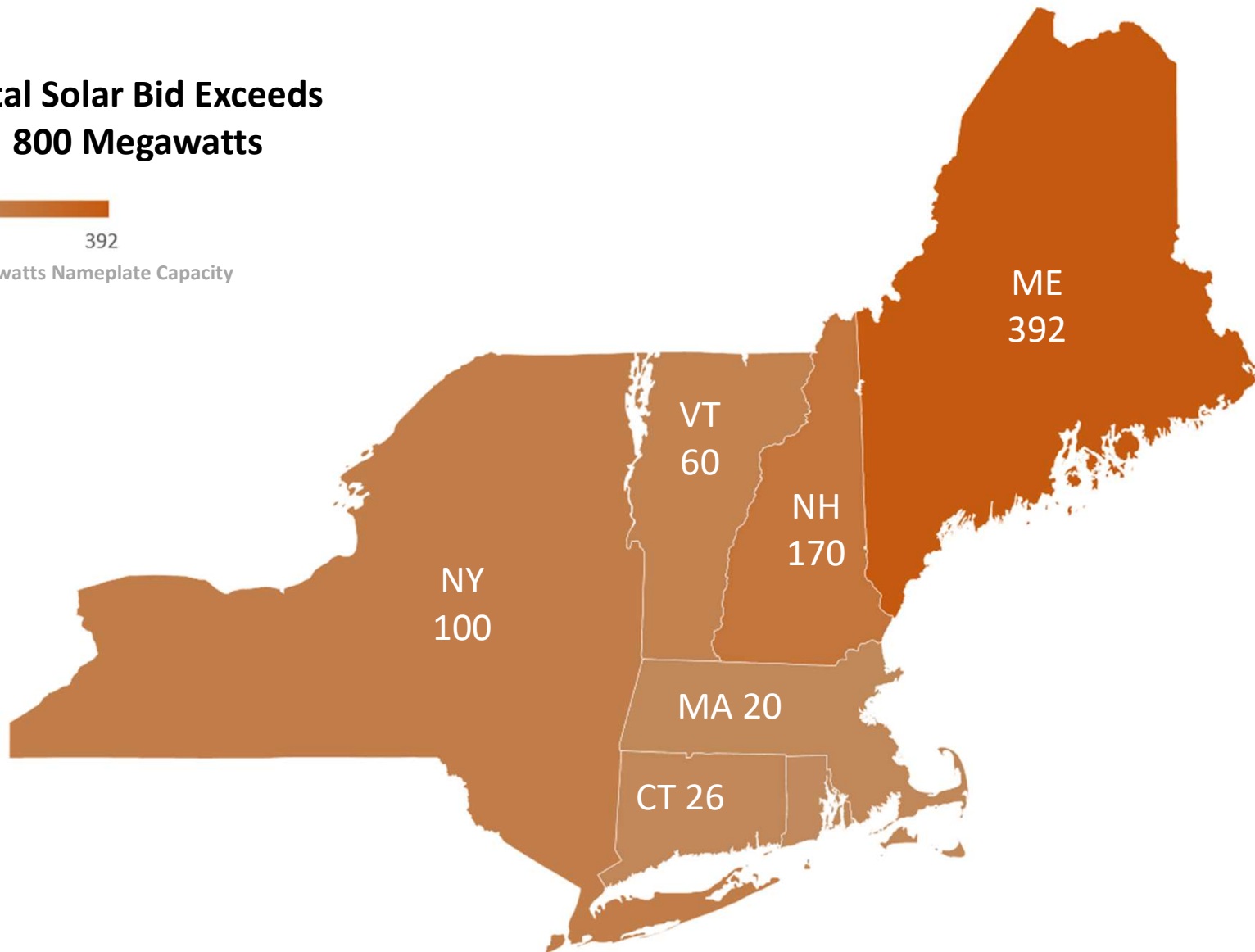


## Massachusetts 2017-2018 Clean Energy RFP

### Solar Bids by Jurisdiction

**Total Solar Bid Exceeds  
800 Megawatts**

0 392  
Megawatts Nameplate Capacity



## New England Offshore Wind Potential



- Offshore wind projects totaling **2,054 megawatts** are today seeking connection to the New England grid. More federal ocean areas are to be leased within the year;
- Massachusetts now evaluating bids to award a contract for 400 megawatts of offshore wind. Connecticut RFP for up to 200 megawatts of offshore wind and/or fuel cells and anaerobic digestors has bids due by April 2, 2018.



## Present and Future Procurements

- This week, Rhode Island Governor Raimondo directed her state's utilities to issue a procurement for up to 400 megawatts of RPS Class I resources and small hydro by this summer;
- Connecticut DEEP has statutory authority remaining to procure over 1,200 megawatts of Class I RPS resources;
- Massachusetts Clean Energy RFP winner announced on Jan. 25 is a non-RPS resource leaving all RPS Class I projects that were bid available for a new solicitation. The RFP team, though, is reconsidering the winning bid due to the rejection last week of its transmission line siting application; and
- **Connecticut joining Rhode Island in a summer RFP will increase competition.** The largest proposals- combinations of wind, solar and/or small hydro of 600 to 1,200 megawatts over new transmission- then become eligible.



# Overcoming Challenges for Large-Scale Solar in Connecticut

# Drivers of Large Solar Costs

## Land Categories for Development: Moving Across the Spectrum

*From Ag Land  
to  
Industrial Zoned  
Development*

*From Ag Land  
to  
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Increasing Public Acceptance of Land for Solar Development



**Increasing Cost of Solar to Ratepayers**

Solar  
Dr  
Case

*Solar Land Prices are  
Driven, in Most  
Cases, by Alternative  
Use Values*

**Lower Land Costs = Lower LCOE to Utility Ratepayers**

# Potential Large Solar Land Use

## State of Connecticut Ag Land Category Statistics

Comparing Connecticut  
Land Resources

To.....

Potential Solar  
Land Use in CT as  
% of Total Land in Farm

Total Land Area of CT	3,100,000 Acres
Land in Farm	436,000 Acres
Total Crop Land	151,000 Acres
Harvested Crop Land	127,000 Acres
Crop Land Not Harvested	24,000 Acres

Source: USDA, National Agricultural Statistics Service

	New MWs	Approx Acres	Cumulative CT Solar Acres	% of Land in Farm
2016 PPAs—All States Solar	544	2,720	n/a	n/a
2016 PPAs – CT Solar	269	1,345	1,345	0.3%
Growth of CT RPS to 27% by 2020 – All States	1,000	5,000	n/a	n/a
Growth of CT RPS to 27% - (assumes 50% in-state CT)	500	2,500	3,845	0.9%
If RPS Grows <u>Beyond</u> 2020 Targets <sup>1</sup> – CT Solar	1,000	5,000	8,845	2.0%

<sup>1</sup>Estimate assuming growth of CT RPS to 33% post-2020  
and 50% of new renewable gen is solar located in CT.



# Connecticut Farmland Is Increasing

Recent times: U.S. government survey reveals agricultural land in Connecticut has actually increased by nearly 80,000 acres since 2002 - from 357,154 acres in 2002 to 436,539 acres ten years later. Data for 2017 is not yet available.

## 2012 CENSUS OF AGRICULTURE

### Connecticut

#### State and County Data

Volume 1 • Geographic Area Series • Part 7

AC-12-A-7

Table 1. Historical Highlights: 2012 and Earlier Census Years

[For meaning of abbreviations and symbols, see introductory text.]

All farms	2012	2007	2002	1997
Farms ..... number	5,977	4,916	4,191	4,905
Land in farms ..... acres	436,539	405,616	357,154	406,222
Average size of farm ..... acres	73	83	85	83
Estimated market value of land and buildings ..:				
Average per farm ..... dollars	809,375	1,045,133	840,302	516,347
Average per acre ..... dollars	11,082	12,667	9,491	6,270
Estimated market value of all machinery and equipment ..:				
Average per farm ..... \$1,000	352,391	315,000	214,739	182,266
Average per farm ..... dollars	58,958	64,090	51,214	37,167
Farms by size:				
1 to 9 acres .....	1,768	1,232	984	1,065
10 to 49 acres .....	2,403	1,894	1,625	1,835
50 to 179 acres .....	1,317	1,287	1,077	1,447
180 to 499 acres .....	379	400	387	453
500 to 999 acres .....	67	63	91	75
1,000 to 1,999 acres .....	29	30	23	26
2,000 acres or more .....	14	10	4	4
Total cropland ..... farms	4,011	3,884	3,395	4,242
Harvested cropland ..... acres	151,144	163,686	170,673	200,586
Irrigated land ..... farms	3,781	3,517	3,000	3,848
..... acres	126,835	136,833	131,248	153,446
..... farms	1,011	789	801	809
..... acres	9,272	9,901	10,139	7,689



# Large Solar and Farmland Are Compatible



**Example: Converting from stone/grass ground cover to a wildflower mix assists pollinators, enhances biodiversity and has a net positive environmental impact.** Opportunities exist for solar projects to take the lead in addressing the pollinator crisis, while supporting the agricultural community. Pollinator habitat combined with solar is considered best practice in Minnesota and is being evaluated throughout the U.S. Pollinators contribute to increased yields and higher quality crops.



# Benefits of Large Solar on Farmland

In 2016, DEEP competitive solicitations to provide clean energy to local utilities showed large solar was the least-cost form of solar electricity and competitive on price with the cheapest form of renewable energy in the region- large-scale wind.

Solar projects of this size also provide other positive economic benefits to host communities, including much needed new tax revenue streams, which often exceed hundreds of thousands of dollars annually.

Utility-scale solar does not need services or other forms of investment from the municipality. Larger solar projects also create many short-term construction jobs and several full-time positions once the projects are operational.

Land payments for utility-scale solar help farmers diversify their revenue stream and alleviate the pressure to sell off the land, which may be slated for more permanent forms of development.



# Recommended Fixes to PA17-218



**STATE OF CONNECTICUT**  
**CONNECTICUT SITING COUNCIL**  
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 Phone: (860) 827-2935 Fax: (860) 827-2950  
 E-Mail: [siting.council@ct.gov](mailto:siting.council@ct.gov)  
[www.ct.gov/csc](http://www.ct.gov/csc)

November 1, 2017

**To:** Energy Industry Representatives  
**From:** Melanie A. Bachman, Executive Director *MAB*  
**Re:** Solar Electric Generating Facilities with a generating capacity of 2 or more megawatts

Please be advised that effective July 1, 2017, pursuant to Public Act 17-218, Connecticut General Statutes §16-50k(a) requires:

"...for a solar photovoltaic facility with a capacity of 2 or more megawatts, to be located on prime farmland or forestland, excluding any such facility that was selected by the Department of Energy and Environmental Protection in any solicitation issued prior to July 1, 2017, pursuant to section 16a-3f, 16a-3g or 16a-3j, the Department of Agriculture represents, in writing, to the [Connecticut Siting Council] that such project will not materially affect the status of such land as prime farmland or the Department of Energy and Environmental Protection represents, in writing, to the Council that such project will not materially affect the status of such land as core forest..."

**Prior to the submission of any petition for a declaratory ruling** for a proposed solar project to the Connecticut Siting Council (Council) that is not exempt as described above, petitioners shall consult with the Department of Agriculture and the Department of Energy and Environmental Protection. Thereafter, the petitioner shall submit to the Council with the petition for a declaratory ruling written correspondence from the Department of Agriculture that such project will not materially affect the status of such land as prime farmland and written correspondence from the Department of Energy and Environmental Protection that such project will not materially affect the status of such land as core forest.

Any petition for a declaratory ruling for a solar facility with a capacity of 2 or more megawatts that is submitted to the Council without the above-referenced written correspondence will be rejected as incomplete. In lieu of submitting a petition for a declaratory ruling, project developers may opt to submit an Application for a Certificate of Environmental Compatibility and Public Need in accordance with the provisions of Connecticut General Statutes §§16-50k and 16-50l, which does not require the submission of written correspondence from the Department of Agriculture or the Department of Energy and Environmental Protection.

Problem: If the Department of Agriculture (DOA) does not make any determination (remains silent) as to whether a project will materially affect prime farmland, then the project is ineligible for expedited declaratory ruling process. DOA effectively can "veto" any solar project- even non-farmland- and require it face the "certificate" process designed for large fossil-fuel power plants. CSC cannot override.

## Solutions:

- Allow for declaratory ruling process if DOA does not submit to CSC a determination on the petition; and
- Require DOA submit any determination against the project within the CSC process, and require CSC to hear from the petitioner rebuttable evidence (e.g., petition contains a plan for keeping land viable for agriculture use after decommissioning).





# A New Market for Clean Energy Resources



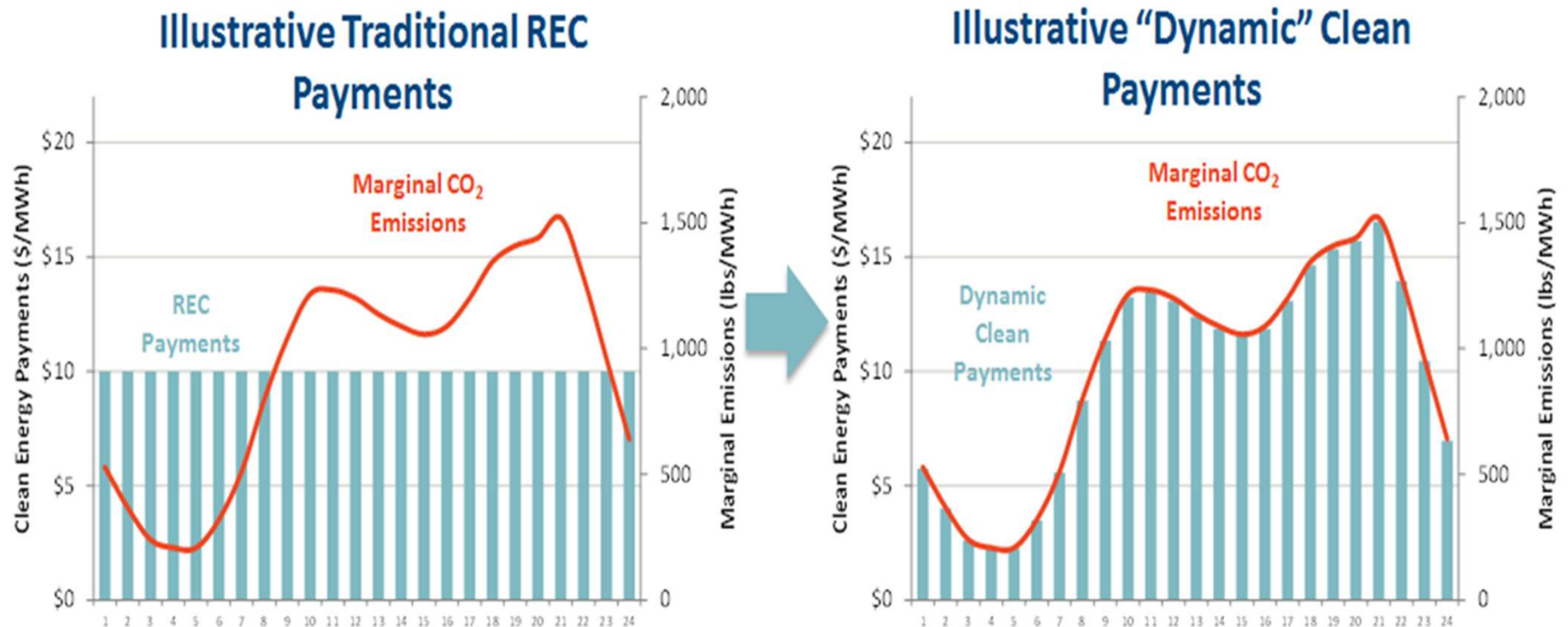
# Forward Clean Energy Market

A coalition- RENEW Northeast, its members NextEra Energy Resources, Brookfield Renewables, and Conservation Law Foundation, and National Grid- is developing a framework for a Forward Clean Energy Market (FCEM).

- States “opt-in” to procure all resources needed to meet their policy goals in a market-based forward auction, which is competitive, transparent and cost-effective
- Treats new and existing the same and creates value for existing clean energy resources and resources coming off state supported contracts
- Payment based on resource response in time and location reflecting ability to reduce GHG emissions – a “dynamic REC”
- These resources treated not subject to today’s offer price restrictions for subsidized resources in the ISO New England forward capacity market so states will not pay twice for clean energy and capacity

# Dynamic Valuation of Clean Energy

Attribute payments under FCEM vary each hour based on the marginal carbon displacement. Total daily revenue may be the same in both scenarios, but there is higher valuation when power is produced during peak carbon emitting hours.





## FCEM Timeline

The coalition is working on the design to ensure financing for new resources despite the varying nature of the payment;

It continues to build regional support among policymakers and stakeholders for the FCEM and a process for its consideration; and

FCEM implementation likely has a long time horizon that will involve changes to state laws, regulations and/or the ISO New England Tariff.

## THANK YOU